

JACC March 19, 2003

ABSTRACTS - Cardiac Function and Heart Failure 177A

pacing at each pacing site did not improve LV diastolic function.

**Conclusion:** LVP and BVP improved LV systolic function in patients with heart failure regardless of the baseline rhythm. In patients with AF, only BVP improved LV diastolic function. These results indicate that BVP may be more beneficial than single-site LVP in patients with heart failure and AF.

## POSTER SESSION

**1111 Exercise Testing: Cardiac Rehabilitation**

Monday, March 31, 2003, Noon-2:00 p.m.

McCormick Place, Hall A

Presentation Hour: 1:00 p.m.-2:00 p.m.

**1111-59 Predictors of Negative Exercise Echocardiography in Women With Positive Exercise Electrocardiograms**

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**BACKGROUND:** Exercise (Ex) electrocardiography (ECG) is the most widely used non-invasive test for evaluating symptoms suggestive of coronary artery disease (CAD). In women, however, Ex ECG has limited reliability due to an increased rate of false positive results. Therefore, a stress-imaging study is frequently the initial test for evaluation of chest pain in women. We have previously reported that certain exercise test variables predict a negative Ex echocardiogram (Echo). To further enhance this predictive value, we report additional exercise test variables predictive of negative Ex Echo.

**METHODS:** We analyzed the results of simultaneous Ex Echo and Ex ECG in women with no known cardiac disease as part of the initial evaluation for chest pain suggestive of CAD. All patients (Pts) had a normal resting ECG and adequate exercise capacity by history. All tests were symptom-limited utilizing a Bruce Protocol. A positive Ex Echo was defined as an Ex-induced regional wall motion abnormality and a positive Ex ECG was defined as Ex-induced  $\geq 1.0$  mm ST segment depression 60-80 msec after the J point.

**RESULTS:** The study group comprised 415 consecutive women (mean age 54 years [31-90]) evaluated by simultaneous Ex Echo and Ex ECG. Ex Echo was positive in 11% (48/415) and negative in 88% (367/415). Ex ECG was positive in 26% (108/415) and negative in 74% (307/415). In 64% (69/108) Pts with a positive Ex ECG, Ex Echo was negative, suggesting a false positive Ex ECG. In this group of 69 Pts, non-Echo Ex test data associated with a negative Ex Echo included:  $\geq 7$  METS, double product  $> 25,000$ , ST depression  $< 1.5$  mm, no Ex-induced chest pain, ST segment resolution  $< 1$  minute into recovery,  $\leq 3$  leads with ST depression. Four or more of these factors were present in 88% (53/69) of the Pts with a positive Ex ECG and a negative Ex Echo. **CONCLUSIONS:** These results indicate that (1) Ex ECG was negative and concordant with Ex Echo in a majority of women and (2)  $> 85\%$  of positive Ex ECG associated with negative Ex Echo were characterized by multiple indicators consistent with a false positive or low risk result. The evaluation of chest pain in women can be simple and cost effective utilizing Ex ECG in those with a normal baseline ECG and adequate exercise capacity.

**1111-60 Abnormal Peripheral Thermoregulatory Response to Exercise Substantially Impairs Exercise Tolerance Among Patients With and Without Ischemia on Myocardial Perfusion Single-Photon Emission Computed Tomography**

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**Background:** Whereas SPECT myocardial ischemia predicts patients (pts) outcome, exercise (EX) duration generally adds substantial incremental information to event prediction. The pathophysiological factors mediating this association are unclear. Paradoxical vasoconstriction in finger blood flow during EX has recently been demonstrated, using peripheral arterial tonometry (PAT), among CAD patients. The relation between such vasoconstriction and EX duration is not known. **Methods:** We employed PAT to assess finger pulsewave amplitude (PWA) at rest and continuously during EX SPECT testing in 463 CAD pts (mean age  $58 \pm 10$  years, 90% males) divided into 270 pts with ischemic and 193 pts with non-ischemic SPECT studies. PWA patterns during EX were compared to previous normal limit values for EX PWA response; with values  $< 90\%$  confidence intervals (CI) constituting abnormality. **Results:** Abnormal finger blood flow response to EX was associated with a substantial reduction in EX duration and achieved EX METs (table). Notably, this association was equally significant among patients with and without SPECT evidence of ischemia. **Conclusions:** Paradoxical reduction in finger blood flow during exercise is associated with significantly reduced exercise duration among CAD patients. Accordingly, this abnormal peripheral vascular response may represent a potential, SPECT-independent, pathophysiological mechanism linking exercise duration to cardiac events.

GROUPS	# OF PATIENTS	EXERCISE DURATION (min)	MET's	PEAK HR
+ SPECT, $\geq 90\%$ CI	210	$8.6 \pm 2.3$	$10.9 \pm 2.8$	$153 \pm 14$
+ SPECT, $< 90\%$ CI	60	$6.8 \pm 2.2^*$	$8.9 \pm 2.7^*$	$146 \pm 13^*$
- SPECT, $\geq 90\%$ CI	166	$8.7 \pm 2.6$	$11.1 \pm 3.1$	$150 \pm 15$
- SPECT, $< 90\%$ CI	27	$6.0 \pm 2.2^*$	$8.7 \pm 2.5^*$	$151 \pm 12$

\* $p < 0.001$  for  $\geq 90\%$  CI vs.  $< 90\%$  CI subgroups

**1111-61****Using Estimated Functional Capacity to Optimize Stress Testing for Diagnosis and Prognosis of Cardiovascular Disease in Women: The NHLBI-sponsored WISE Study**

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**Background:** Functional capacity, measured in METS, is an important component that affects the diagnostic and prognostic value of exercise stress testing. The aim of this study was to compare the prognostic value of predicted functional capacity based on the Duke Activity Status Index (DASI) compared with peak exercise METS.

**Methods:** From the NHLBI-sponsored WISE study, a total of 260 women with chest pain (average age=56 years) underwent exercise testing and completed the 12-item DASI questionnaire.

**Results:** Average exercise time was  $5.7 \pm 2.5$  minutes on the (modified) Bruce or ACIP protocols and average DASI functional capacity was 6 METS. 2.3-year cardiovascular events (unstable angina, death, myocardial infarction, heart failure, or stroke) were reported in 47 women. Exertional ischemia occurred in 58% and 32% had a coronary stenosis  $\geq 50\%$ . In women with DASI-predicted METS  $< 4.7$ , no inducible ischemia occurred more (71% vs. 40%), with  $\leq 85\%$  predicted maximum heart rate more (24% vs. 9%) often in functionally impaired women ( $p=0.002$ ); despite similar disease prevalence. In **Conclusion**, among women referred for coronary angiography for suspected myocardial ischemia, marked functional impairment estimated by a simple estimate of functional capacity is associated with an adverse prognosis. Use of the DASI prior to exercise stress testing may stratify candidates for exercise testing or pharmacologic stress.

## 2.3-Year Event Rates

%	<4.8	4.8-7.4	7.5-9.9	>9.9	p value
DASI-estimated METs	29	13	10	7	0.0001
Exercise METs	25	19	14	7	0.03

**1111-62****High Treadmill Workload in Patients With Exercise-Induced ST Depression Predicts a Negative Result on Exercise Echocardiography**

Amish J. Desai, Amogh Bhat, Daljit Bagha, Mrudula Guthikonda, Ezra A. Amsterdam, University of California, Davis Medical Center, Sacramento, CA

**BACKGROUND:** Although exercise (Ex) electrocardiography (ECG) is the most commonly employed initial test to assess patients with symptoms suggestive of coronary artery disease (CAD), it has limited diagnostic accuracy. Therefore, patients (Pts) with positive tests for myocardial ischemia are frequently referred for further evaluation by noninvasive stress imaging such as Ex echocardiography (Echo). A negative Ex Echo is considered evidence of absence of high risk CAD and of low clinical risk. It has recently been shown that functional capacity is a strong predictor of prognosis. Thus, in a group of Pts with positive Ex ECG but high treadmill workload, we investigated the results of secondary evaluation by Ex Echo. **METHODS:** We analyzed the results of 140 consecutive pts (110 males, 30 females; mean age 51 yrs [30-82]) referred for Ex Echo after a positive Ex ECG and a treadmill workload of  $\geq 10$  METS. All Pts had a normal resting ECG. Exercise tests utilized a Bruce protocol and were symptom-limited. A positive Ex ECG was defined as Ex-induced  $\geq 1.0$  mm ST segment depression 60-80 msec after the J point and a positive Ex Echo was defined by an Ex-induced regional wall motion abnormality. **RESULTS:** Ex Echo was negative in 94% (131/140) of Pts and positive in 6% (9/140). **CONCLUSIONS:** Ex ECG performed to a high workload is highly predictive of a negative Ex Echo and thus low prognostic risk in Pts referred because of positive Ex ECG. Pts with ST depression on Ex ECG, who achieve at least 10 METS during treadmill Ex, may not require additional noninvasive or invasive evaluation.

**1111-63****Impact of Obesity on Inflammation and Metabolic Syndrome in Coronary Patients and Effects of Cardiac Rehabilitation**

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**Background:** Obesity is epidemic in the US and represents a major risk factor for CAD and type II diabetes. Limited data, however, exist on the effects of obesity on such risk factors as inflammation and components of the metabolic syndrome (MS) as defined by ATP III in CAD patients, and the effects of cardiac rehabilitation and exercise training programs (CRET) in these patients.